

**Feedforward and Feedback Control for Conditioning  
of Chemical Mechanical Polishing Pad**

**Abstract of the Disclosure**

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A method, apparatus and medium of conditioning a planarizing surface includes installing a wafer to be polished in a chemical mechanical polishing (CMP) apparatus having a polishing pad and a conditioning disk, polishing the wafer under a first set of pad conditioning parameters selected to maintain wafer material removal rates with preselected

- 10 minimum and maximum removal rates, determining a wafer material removal rate occurring during the polishing step, calculating updated pad conditioning parameters to maintain wafer material removal rates within the maximum and minimum removal rates, and conditioning the polishing pad using the updated pad conditioning parameters, wherein the updated pad conditioning parameters are calculated using a pad wear and conditioning model that predicts
- 15 the wafer material removal rate of the polishing pad based upon pad conditioning parameters, such as the conditioning down force and rotational speed of the conditioning disk.